

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of	)	
Amendment of the Commission's Rules	)	
Regarding Dedicated Short-Range Communication	)	WT Docket 01-90
Services in the 5.850-5.925 GHz Band (5.9 GHz	)	
Band)	)	
Amendment of Parts 2 and 90 of the Commission's	)	
Rules to Allocate the 5.850-5.925 GHz Band to the	)	
Mobile Service for Dedicated Short Range	)	ET Docket No. 98-95
Communications of Intelligent Transportation	)	RM-9096
Services	)	

**Comments of the  
Alliance of Automobile Manufacturers**

Summary:

The Alliance of Automobile Manufacturers is a trade association of 10 car and light truck manufacturers who account for more than 90 percent of U.S. vehicle sales. Member companies, which include BMW Group, DaimlerChrysler, Ford Motor Company, General Motors, Mazda, Mitsubishi Motors, Nissan, Porsche, Toyota and Volkswagen, employ more than 620,000 Americans at 250 facilities in 35 states.

The Alliance recognizes and strongly supports the FCC's allocation of the 5.850 – 5.925 GHz band for Dedicated Short Range Communications (DSRC) in support of Intelligent Transportation System (ITS) services. Wireless communications (using DSRC) between vehicles and between vehicles and infrastructure hold significant promise to improve the reach

and effectiveness of vehicle safety systems and enable new safety applications never before possible.

The Alliance supports the position that the 5.9 GHz DSRC band should be used primarily for *“public safety”* purposes.

The definition of commercial viability merits broadening in order to adequately encompass deployment scenarios envisioned for DSRC-based vehicle safety applications. These applications achieve their greatest safety benefits when in their widest possible deployment to the public in personal and fleet vehicles.

The Alliance believes that commercial, non-safety related use of the spectrum, including private vehicle-to-vehicle uses, should also be allowed as long as safety-related uses are given highest priority. This recognizes the expectation that commercial users and services, while coexisting on the DSRC band with safety services on a non-interference basis, will play an important role in subsidizing and, therefore, expediting the deployment and, likewise, the growth in effectiveness of associated DSRC-based safety systems.

The Alliance supports the fundamental need for nationwide interoperability for DSRC applications and fully supports the efforts to ensure that 5.9 GHz DSRC is interoperable throughout the United States through a single set of DSRC standards.

The Alliance is concerned that until agreement is achieved on the upper layers (layer 3 and above) of the DSRC standard that it is premature to achieve the level of specificity proposed regarding the band plan.

In the absence of the upper layers being fully and adequately defined, it is difficult today to ensure that public safety's priority will be realized in a reliable and timely manner.

Lastly, the Alliance is concerned that beyond Road Side Unit (RSU) and On-Board Unit (OBU) type certification, there is need for additional control over the applications for which RSUs and OBUs are employed to avoid degradation of the functionality of safety applications (e.g., due to over-crowding and/or inappropriate use in terms of adhering to safety priorities). We look forward to reviewing the perspective of other commenters to assist us in refining our views and we expect to discuss this issue further in the reply comment phase.



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**COMMENTS  
OF  
THE ALLIANCE OF AUTOMOBILE MANUFACTURERS**

The Alliance hereby submits the following comments in the above captioned matter.

**Background**

The Alliance of Automobile Manufacturers is a trade association of 10 car and light truck manufacturers who account for more than 90 percent of U.S. vehicle sales. Member companies, which include BMW Group, DaimlerChrysler, Ford Motor Company, General Motors, Mazda, Mitsubishi Motors, Nissan, Porsche, Toyota and Volkswagen, employ more than 620,000 Americans at 250 facilities in 35 states. Alliance member companies have a long history as leaders in automotive safety and in the emerging intelligent transportation system technology. The Alliance supports the FCC's allocation of the 5.850-5.925 GHz band (5.9 GHz band) for Dedicated Short-Range Communications (DSRC) services for Intelligent Transportation System (ITS) radio service. Wireless communications, both between vehicles, and between vehicles and infrastructure, have the potential to significantly improve vehicle safety.

In order to pursue this potential, BMW, DaimlerChrysler, Ford, GM, Nissan, Toyota, and VW formed the Vehicle Safety Communications Consortium (VSCC) to participate in a cooperative project with the United States Department of Transportation. This effort, the Vehicle Safety Communications (VSC) Project, is a two-year program that began in May, 2002, to evaluate potential vehicle safety applications enhanced or enabled by wireless

communications; to determine associated communication requirements, and to promote their accommodation in developing communications standards.

The early results from VSCC research indicate that DSRC at 5.9 GHz has the potential to provide the low-latency wireless communications that would be necessary to support most of the vehicle safety applications envisioned by the VSCC. The low-latencies achievable with DSRC do not appear to be possible using other wireless communications technologies that are widely available or currently being planned for wide deployment.

In addition, the VSCC has been actively working with standards development organizations to ensure that proposed 5.9 GHz Dedicated Short Range Communications (DSRC) protocols support vehicle safety applications. Rules that guarantee the availability of this spectrum for the long-term support of vehicle safety applications will be necessary to achieve the anticipated, significant safety benefits.

Modern automobiles have a long life cycle in comparison with consumer electronics devices, in many cases extending to ten years or more. In addition, because of the extensive validation and testing requirements for vehicles, the development times are long in comparison with consumer electronics products, generally spanning two or three years. The deployment of vehicle safety applications enabled by DSRC communications will therefore take some time, and the anticipated safety benefits will accrue over a much longer period as the percentage of vehicles, and infrastructure, equipped with these systems grows over time.



## **Overview**

The Commission's decision in this matter will be critical to achieving the anticipated safety benefits from DSRC. In assessing the comments in this proceeding, the Alliance urges the Commission to recognize that the vehicular environment in which DSRC service is delivered will be constantly changing. At various times it will be delivered at high speeds, or at rest, and at other times in the midst of congestion and or with few or no other vehicles on the road.

As with any safety application, timeliness and reliability will be essential to successful implementation. To achieve these, the standards and rules governing the control channel must emphasize and support small data payloads (short duration transmissions), high data rates, and low latency. To this end, the Alliance believes it will be essential to ensure that the control channel is uncluttered; that the selected approach to licensing avoids harmful interference, and that appropriate standardization is employed to avoid incompatibility that would compromise the ability of drivers to rely on DSRC-based safety systems. Time is critical in crash avoidance at highway speeds; at 70mph a vehicle travels more than 10 feet per *tenth* of a second.

## **Defining DSRC**

We agree with the ITS America recommendation that the word "non-voice" be deleted from the definition of DSRC for the reasons discussed in the Notice. We also agree with

the Commission's proposal to replace the phrase "and commercial environments" with the phrase "a variety of environments" for the reasons mentioned.

### **Eligibility**

We support the position that the 5.9 GHz band should be used primarily for "public safety" purposes. In this regard, however, the Alliance is concerned that any definition of "public safety" be broad enough to include OBU to OBU (i.e., vehicle-to-vehicle) communication of messages related to vehicle safety. In addition, the definition needs to comprehend that the OBU will be sold as a standard or optional feature on a vehicle, or perhaps at some point as a retrofit. In considering incorporating vehicle safety applications, it is important to recognize that a significant portion of the envisioned vehicle safety applications would rely upon *ad hoc* communications between vehicles.

These *ad hoc* communications would depend upon standards, standard protocols and standard message sets to provide useful information to other vehicles within receiving range. Each vehicle receiving such information would evaluate the situation according to the algorithms programmed into its on-board systems, and take whatever actions the systems were programmed to make under those circumstances. Importantly, the *ad hoc* vehicle safety applications would become much more valuable as they become more widely deployed.

While supporting the primary use of the band for public safety, we also support the 5.9 GHz DSRC spectrum use concept that allows private applications to share the spectrum



on a non-interference basis with public safety applications. We agree with ITS America that such a shared use “will ensure that the band is put to its best and highest use for the greatest public benefit”. Allowing such a mixture of applications on this spectrum may lead to earlier and wider deployment of DSRC devices, while preserving the intended use of the spectrum for public safety applications. The requisite safeguards must of course be instituted to ensure that the non-safety applications do not jeopardize the reliability of the higher-priority safety applications.

However as set forth in the Notice, ITS America’s definition of “private services” does not include vehicle-to-vehicle private applications. This would prohibit, for example, vehicle-to-vehicle data transfers except in cases of vehicle safety, and limit potential vehicle-to-vehicle ad-hoc networking applications. Such a result would be overly restrictive, especially when the proposal allows for private service usage of DSRC for non-public safety applications.

Thus, the Alliance urges the Commission to ensure that the definition of “private services, does not restrict the use of DSRC for vehicle-to-vehicle private applications, and to adjust the list of DSRC-based ITS applications shown in Appendix B to include vehicle-to-vehicle private applications.

### **Interoperability**

As implied in the preceding discussion, interoperability is critical to the success of DSRC. Thus, the Alliance supports the fundamental need for nationwide interoperability

for DSRC applications, and fully supports the efforts of the DOT and ITS America to ensure that 5.9 GHz DSRC is interoperable throughout the United States through a single set of open DSRC standards. We agree that this is necessary so that, for example, vehicle-to-vehicle safety applications on one brand of vehicles will be able to interact with vehicle-to-vehicle safety applications on another brand. In addition, many envisioned vehicle safety applications use vehicle-to/from-infrastructure communications, with Road Side Units (RSUs) providing the infrastructure component of the vehicle safety applications. This necessary interaction between vehicles and infrastructure will require a nationwide standard to ensure that these safety applications will operate in the same way in one region of the country as in other regions. We also encourage the efforts by all involved parties to integrate 5.9 GHz DSRC development efforts on a consistent basis throughout North America, through coordination efforts with Canada and Mexico.

We agree with ITS America that the most effective mechanism to realize the interoperability goal is for the Commission to require compliance with the ASTM-DSRC Standard, to the extent that this represents an open standard. Modern automobiles have a long life cycle in comparison with consumer electronics devices, in many cases extending to ten years or more. In addition, the development times for particular vehicle models are very long in comparison with consumer electronics products, generally spanning two or three years. For DSRC, to be considered for integration into automotive production, the automotive manufacturers must be certain of long-term technical stability at the basic levels of DSRC technology. This long-term technical stability can best be ensured by the

Commission requiring compliance with the ASTM-DSRC Standard for all operations on the 5.9 GHz DSRC spectrum.

More specifically we recommend that the Commission adopt the ASTM Lower Layer (Layer 1 and Layer 2) DSRC Standard for all DSRC operations in the 5.9 GHz band, and that this adoption include subsequent revisions to the ASTM Lower Layer DSRC Standard. In general, the lower protocol layers are implemented in silicon chip sets, while the upper layers are implemented in software. By specifying the ASTM Lower Layer DSRC Standard in the FCC's rules for the use of the 5.9 GHz spectrum for DSRC, long-term stability is ensured at the hardware level. By allowing for more rapid technological improvement at the upper layers of protocol, the efficient updating of DSRC through software upgrades could also be supported. The ASTM standards development and revision process appears to be capable of making certain that future revisions to the lower layer standard will continue to support the earlier implementations of the standard, thus ensuring long-term stability in the fundamental technical hardware basis for DSRC.

### **Band Plan**

The Alliance is concerned that, until agreement is achieved on the upper layers (layer 3 and above) of the DSRC standard, it is premature to achieve the level of specificity proposed regarding the band plan. In the absence of the upper layers being fully and adequately defined, it is difficult to ensure that "listening before talking" and the assignment of priority for public safety messages (including vehicle safety messages) will



be sufficient to ensure that public safety's priority is realized in a reliable and timely manner.

In this regard, it is imperative that message security considerations be addressed prior to deployment of DSRC-based safety systems. Message integrity is critical in safety applications, upon which driver actions and possible vehicle deployment of safety systems may depend. The resolution of these issues will occur in the standards discussions related to the upper layers of the standards, and these decisions in turn will effect how the band should be constructed.

If, notwithstanding this concern, the Commission determines that it is appropriate to proceed, the Alliance believes that several adjustments are required to the plan proposed in the Notice. For example, the Commission should not segregate vehicle-to-vehicle communications into Channel 172. This segregation of vehicle-to-vehicle communications into Channel 172 represents a channelization plan proposed in earlier DSRC standards discussions. The original concept, embodied in the illustrated band plan in the Notice, was to have all vehicle safety applications operate on Channel 172, since it was assumed that all such applications would be based upon vehicle-to-vehicle communications. However, vehicle safety applications being studied by the VSCC, and whose requirements have been proposed to the DSRC Standards Writing Group, include both applications that require vehicle-to-vehicle communications and applications that require communication with infrastructure units. Implementation of an approach for vehicle safety requiring vehicle-to-vehicle communications on a separate channel from

vehicle-to/from-infrastructure communications is likely to preclude the feasibility of automotive manufacturers deploying the full range of envisioned vehicle safety applications on 5.9 GHz DSRC.

As a result, it has more recently been agreed within the DSRC Standards Writing Group that vehicle-to-vehicle communications should be allowed to occur on the Control Channel (Channel 178), and will not necessarily be disallowed on service channels. At the July 2002 DSRC Standards Writing Group meeting, in particular, the group agreed in principle that simple vehicle safety applications that do not violate the proposed operational rules of the Control Channel may be operated on the Control Channel, even if they are vehicle-to-vehicle based.

Consistent with this more recent view, the Alliance proposes the label under “CH172” in the Band Plan illustration accompanying paragraph #35 should be changed from “service (vehicle-to-vehicle)” to “service (high-availability, low-latency)” to effectively support vehicle safety applications that are high-priority and require high-availability, low latency DSRC channel for communication.

## **Licensing**

The Alliance recommends that private RSUs of low power (Class 1 and Class 2) be required to be type-certified under the commission rules, and enforced so as not to interfere with public safety communications. As pointed out in the Notice, site specific

licensing is very cumbersome, costly and has several potential disadvantages (see NPRM paragraph 46). The licensing requirements and cost could prevent the rapid deployment of private DSRC applications that only use low power.

The Alliance further recommends that DSRC OBUs be type-certified under the Commission rules to comply with the ASTM Lower Layer DSRC Standard for all DSRC operations within the 5.9 GHz ITS spectrum. Any licensing scheme that forced manufacturers to license individual vehicles would seriously discourage deployment of this technology..

The Alliance is concerned that beyond RSU and OBU type certification, there is need for additional control over the applications for which RSUs and OBUs are employed in order to avoid degradation of the functionality of safety applications (e.g., due to over-crowding and/or inappropriate use in terms of adhering to safety priorities). We look forward to reviewing the perspective of other commenters to assist us in refining our views and we expect to discuss this issue further in the reply comment phase.

When the appropriate standards are consensed upon for the upper layers of DSRC, these should also be complied with for the type-certification of RSUs and OBUs.

Unlicensed operations under Part 15 in the 5.9 GHz vicinity may include devices that are not "type-certified" for operation in the DSRC band. Such devices should remain confined to the 5.725-5.850 GHz range, as is presently the case. The majority of the



vehicle safety applications being studied by the VSCC have inherent requirements for extremely low-latency communications. Of the potentially available wireless communications technologies, DSRC is uniquely suited to being able to support these latency requirements and, therefore, should be afforded the best chance for success by excluding unlicensed devices from operating in this band.

The operation of devices that are not “type-certified” for operation on the 5.9 GHz DSRC frequencies would be expected to increase the system latency through direct interference, as well as through reduced channel availability. In addition, channel capacity, especially for the Control Channel, is already an area of technical concern within the DSRC Standards Writing Group. The use of non type-certified devices on the Control Channel, in particular, could readily create overload conditions on this critical channel. Inappropriate usage by type-certified devices for non-safety applications or lower priority safety applications could also potentially overload the control channel. Mechanisms such as ‘listening before talking’ and limited broadcast payloads will help increase system reliability.

It is expected that systems such as the Fixed Satellite Service will not interfere with the reliable functioning of DSRC based safety applications.

The Alliance notes that the NPRM thus far has not addressed the networking of RSUs, nor ad-hoc networking of OBUs in any detail. Future work in the DSRC standards body

and subsequently the Commission must begin to address the issues surrounding these topics.

The Alliance appreciates the consideration of its views regarding this important matter.

Respectfully submitted,

March 17, 2003